

A 2nd Opinion on **Ethanol Denaturant**

Presented to:

Air Resources Board

**Meeting to Discuss Issues Relating
to the California Phase 3 RFG
Regulations**

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by

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A 2nd Opinion, Inc.

RFA Suggested Fuel Ethanol Specifications (6/15/00)

	Maximum
Sulfur, ppm mass	15
Benzene, vol%	0.10
Olefins, vol%	0.50
Aromatics, vol%	1.70

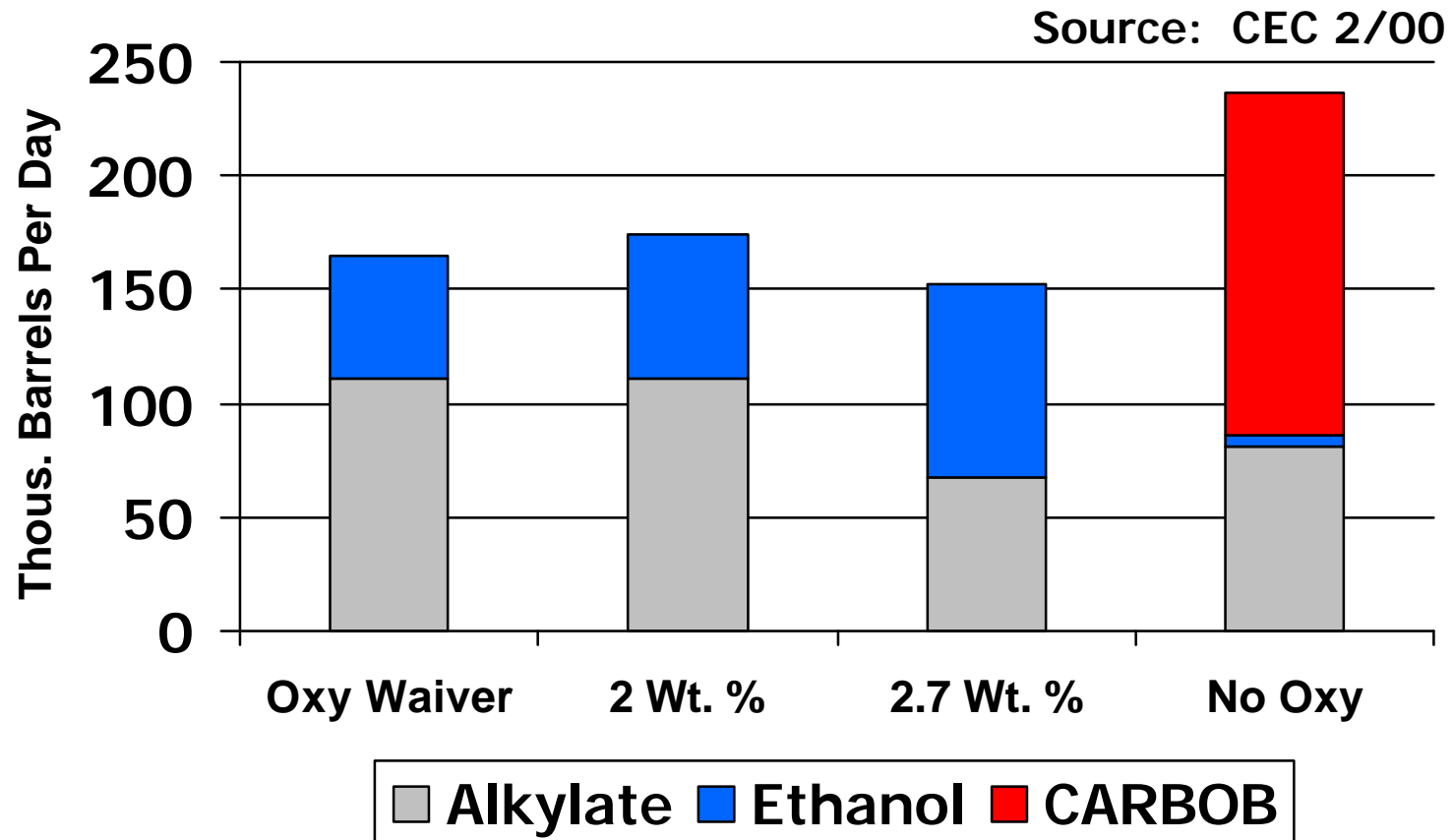
Implied Denaturant Specifications are Worse than CaRFG3

	Denaturant CaRFG3	
Sulfur, ppm mass	91-281	20
Benzene, vol%	2	0.80
Olefins, vol%	10	6.0
Aromatics, vol%	34	25

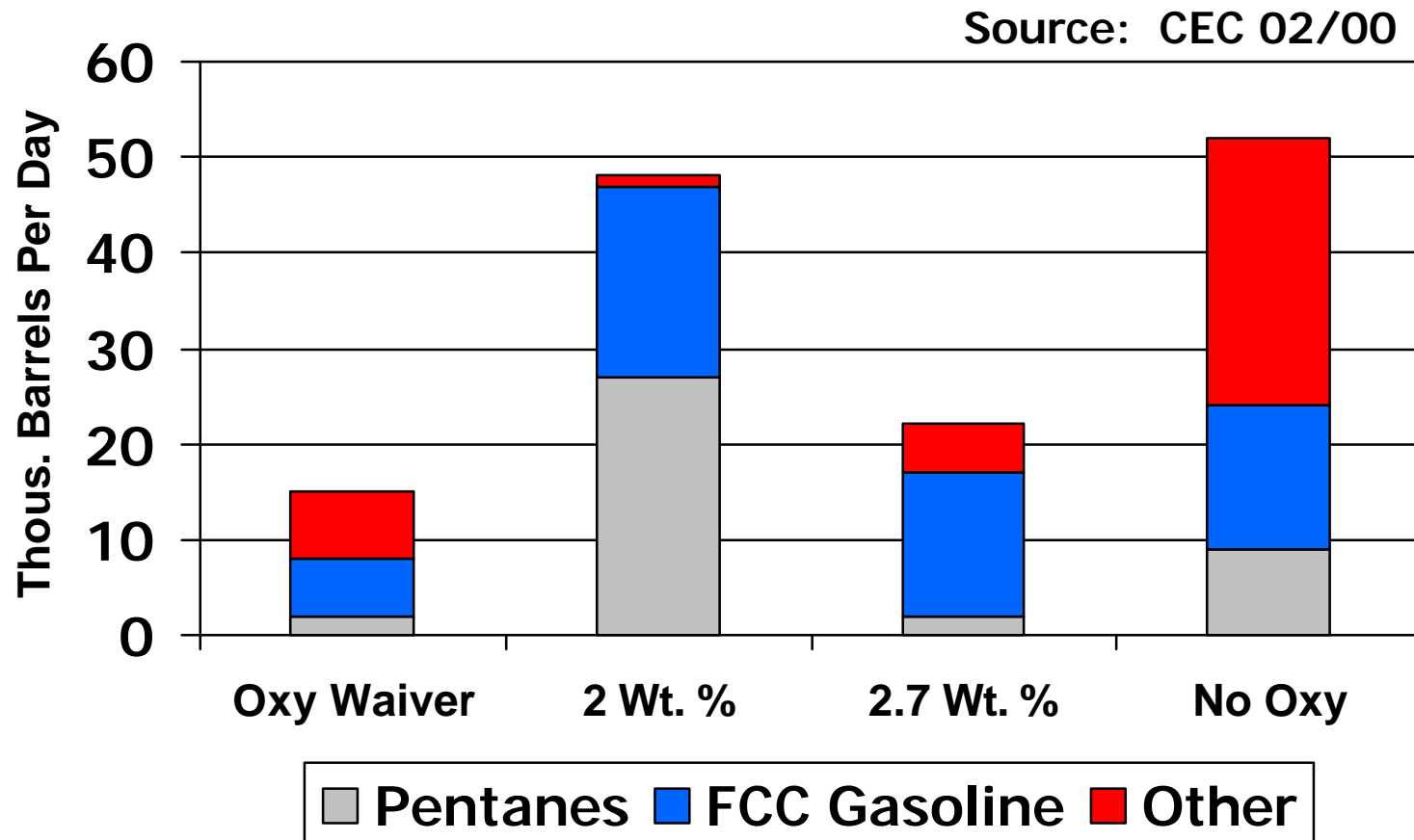
WHY.....?

- **California needs alkylate imports**
- **California needs to export light olefinic aromatic stocks**

Results: No MTBE + ARB Proposal - *Imports*



Results: No MTBE + ARB Proposal - *Exports*



Why Accept Denaturant Worse than CaRFG3?

Fuel Ethanol Specification, Maximums

	RFA 6/15/00	A ₂ O 7/25/00
Sulfur, ppm mass	15	11
Benzene, vol%	0.10	0.04
Olefins, vol%	0.50	0.30
Aromatics, vol%	1.70	1.25

Additional Specifications

- To do no harm, the denaturant's RVP specification needs to be a maximum of 7.0 psi.
- Because California needs to import alkylate with a midpoint above the CaRFG3 specifications, I recommend you *not* limit midpoint or, if you must, use the cap limit of 220°F.

Proposed Denaturant Specifications Match CaRFG3

	RFA	A ₂ O	CaRFG3
Sulfur, ppm	91-281	20	20
Benzene, vol%	2.00	0.80	0.80
Olefins, vol%	10.0	6.0	6.0
Aromatics, vol%	34.0	25.0	25.0
RVP, psi	@NA	7.0	7.0

Blendstocks that Fit

- CARFG3
- Some desulfurized reformer feeds
- Raffinate from aromatics extraction
- Alkylate

Economics

- If the clean denaturant costs 20¢/gal. more than the current witch's brew, it adds one penny to the delivered ethanol cost.
- Most of this comes back as California refiners fine tune the base stock.

Conclusion

Why denature ethanol with undesirable blendstocks when ethanol producers only have to find *one* tank car of clean denaturant for every *20* tank cars of ethanol shipped to California?

Why import a blendstock you would not import if it were not commingled with ethanol?